With tightened budgets and slashed funds, energy efficiency has been thrust to the forefront, and one entity of The Texas A&M University System is doing its part to help System members, as well as other government agencies, save money and increase energy efficiency in their buildings.

Through a program known as the Continuous Commissioning® process, the Energy Systems Laboratory (ESL), a center in the Texas A&M Engineering Experiment Station (TEES), has worked to produce more than $100 million in savings in more than 300 buildings throughout Texas, the United States and the world.

The Continuous Commissioning® process uses an ongoing effort to resolve operating problems, improve comfort, and optimize energy use for existing commercial and institutional buildings and central plant facilities. TEES has trademarked the process, which is being commercialized through the Texas A&M System's Office of Technology Commercialization.

“When I was growing up, we tuned our cars up pretty often, and that could make a significant difference in gas mileage,” says David E. Claridge, director of ESL and a professor in the Department of Mechanical Engineering at Texas A&M University. “The Continuous Commissioning® process is a structured process for providing that kind of tune-up to building operation.”
The work of the Energy Systems Laboratory (ESL) is not limited just to industry. The center also helps homeowners throughout Texas achieve energy savings.

A recent ESL study found that adopting and implementing energy codes for new-home construction saved homeowners more than $1.7 billion statewide. The study covered eight years after the passage of the Texas Emission Reduction Plan (TERP).

According to the study, more than 1 million homeowners in Texas who benefited from energy-efficient new homes saw an average reduction of $201 in their utility bills.

A major energy-efficiency element of TERP is the establishment of the Texas Building Energy Performance Standards, which define the building energy codes for all new residential and commercial building construction statewide.

ESL is responsible for helping to implement energy codes statewide, including reviewing and recommending state adoption of new building energy code editions.

ESL also reviews local code amendments and offers technical assistance to local municipalities, cities and councils of governments. ESL is the prime source for energy-code information and training for the entire building community, and ESL’s financial vice president to find the money to make Continuous Commissioning® happen on the Texas A&M campus.

A decision was made to take money from the campus’ utilities budget, giving the process its start, but also putting pressure on then-ESL Director Dan Turner, Claridge and their colleagues to produce results somewhat quickly.

“Knowing that the utility budget was a biennial budget, we knew we had to save enough in two years to pay for the work we were doing,” Claridge says.

Before they could even begin to study the energy efficiency of the buildings on campus, heating, cooling, and electric meters had to be installed, leading to an initial outlay of nearly $750,000.

The Austin City Hall realized savings of more than $70,000 during the first 12 months Continuous Commissioning efforts were implemented.

“City is a systematic way of looking at buildings and locating problems, and then working with the building operators to correct them.”

The origins of Continuous Commissioning® saving money at Texas A&M date back to 1995, when the idea was first brought to then-President Ray M. Bowen. After being briefed on the process, Bowen’s financial vice president was significantly impressed and scheduled a meeting with Bowen and individuals from ESL.

Bowen, who has an engineering background, was duly impressed and told his financial vice president to find the money to make Continuous Commissioning® happen on the Texas A&M campus.

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“A key aspect of this is you need to have measurements of the energy going into the building before you can effectively see what you are accomplishing,” Claridge says.

After installing meters in the first 20 buildings, data were analyzed and a decision was made to focus on the Kleberg building, which then was just under 20 years old and was using a great deal of heating and cooling.

The ESL group found that in an effort to fix humidity problems in the building, the air coming into it was being heated to 110 degrees, then immediately being cooled to 55 degrees.

The total savings in just the Kleberg building were almost enough to recoup the initial startup cost of the meters for the program.

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Through the use of Continuous Commissioning® process, the Dallas/Fort Worth International Airport has realized more than $13 million in cumulative energy savings.

“It was one of those things where you have a very vexing problem and you are trying to figure out how to fix it,” Claridge says. “Somewhere along the way, someone thought of this and those problems seemed to go away.”

Simply turning off those coils saved nearly $200,000 per year, according to Claridge. Going through the rest of the building, finding other problems and making modifications, saved another $200,000 per year.

The total savings in just the Kleberg building were almost enough to recoup the initial startup cost of the meters for the program.

“The savings in that building were significantly more than the total operating cost of many similar buildings on campus,” Claridge says. “We immediately saved essentially enough to pay for the metering on the whole campus in two years in just that one building.”

The savings were also enough to sway Bowen, who admitted some years later that he was initially skeptical of the concept.

“Several other campuses in the A&M System have also implemented the program, including Texas A&M International University in Laredo, where Claridge says they have done the most work, cutting campus consumption by 15–20 percent.

The effort has also spread throughout the state to such entities as the Brooke Army Medical Center in San Antonio, where it produced 10 percent savings in a brand-new building; the Alamo Colleges in San Antonio; Dallas/Forth Worth International Airport; and IBM.

Also, through licensees, more than 30 military hospitals worldwide and a dozen Veterans Administration hospitals are using the program.

Recently a new project was started with the Texas Facilities Commission in Austin, continuing ESL’s efforts in an area where it is also using the Continuous Commissioning® process in Austin Independent School District buildings and in conjunction with Austin Energy’s Building Tune-Up Program.

“The Continuous Commissioning® process ended up being significantly more successful than our initial estimates,” Claridge says. “You can say we hoped it would be successful, but we certainly had no idea how much it would save.

“I wouldn’t have said we are definitely going to be able to save an average of 15 or 20 percent. There is no way I would have said that. People would have laughed us out of the building.”

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Saving energy & money

With tightened budgets and slashed funds, energy efficiency has been thrust to the forefront, and one entity of The Texas A&M University System is doing its part to help System members, as well as other government agencies, save money and increase energy efficiency in their buildings.

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ENERGY SYSTEMS LABORATORY

The Texas A&M Engineering Experiment Station’s Energy Systems Laboratory was formed in 1985 primarily to conduct energy efficiency research in building systems and industrial facilities. It also brings energy efficient assessments and improvements to scores of public buildings, schools, and private enterprises across Texas through research and deployment of energy-efficient technologies and techniques, including the integration of renewable energy sources in buildings.

The Energy Systems Lab has helped Texans save hundreds of millions of dollars by increasing energy efficiency of buildings, including the Dallas/Fort Worth International Airport, the Texas Health and Human Services Commission, the U.S. Army Medical Command at Fort Sam Houston, and at city, county and private sector buildings.

Building cooling and heating optimization work

Current and past public and private projects include:

- Dallas/Fort Worth International Airport
  - $13 million in documented savings
  - Named the 2010 Energy Project of the Year by the Association of Energy Engineers
- Texas A&M main campus
  - More than $75 million in savings since 1995
  - Texas A&M’s campus energy use is 44 percent less per square foot than in 1993
- Texas A&M International University Green Campus Initiative
  - $1.6 million in savings since 2005
  - TAMIU’s campus use is 28 percent less per square foot than in 2000
- U.S. Army Medical Command
  - More than $20 million in savings in 33 hospitals worldwide
- Alamo Community Colleges in San Antonio
  - $7.8 million in savings since 2002
- IBM Global Energy Management
  - More than $3 million in savings since 2005

ESL experts

- provide building energy code training statewide to builders and code enforcement officials
- perform annual air emissions calculations for the Texas Commission on Environmental Quality and the U.S. Environmental Protection Agency
- conduct, with Texas A&M Engineering students, small industrial energy surveys funded by the U.S. Department of Energy for private industry
- test fan, sound and HVAC systems for manufacturers
- assist The Texas A&M University System in purchasing aggregated electricity for all system members and institutions

"The Continuous Commissioning process ended up being significantly more successful than our initial estimates."

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